WHAT THE FUTURE BRINGS:

FREQUENCY CONVERSION

AND

NATIONAL NETWORK PLANS

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New Developments in Profiling

Data Distribution

- Expanded on-line availability of data
  - NPN: 1992 to Current
  - CAP: 2000 to Current
- Enhanced WWW Interface
  - Identification of on-line data for display (graphic or numeric)
  - Data download to customer's computer
  - Access to archived data
  - Data provided via tape or CD-ROM

New Developments in Profiling

Data Distribution

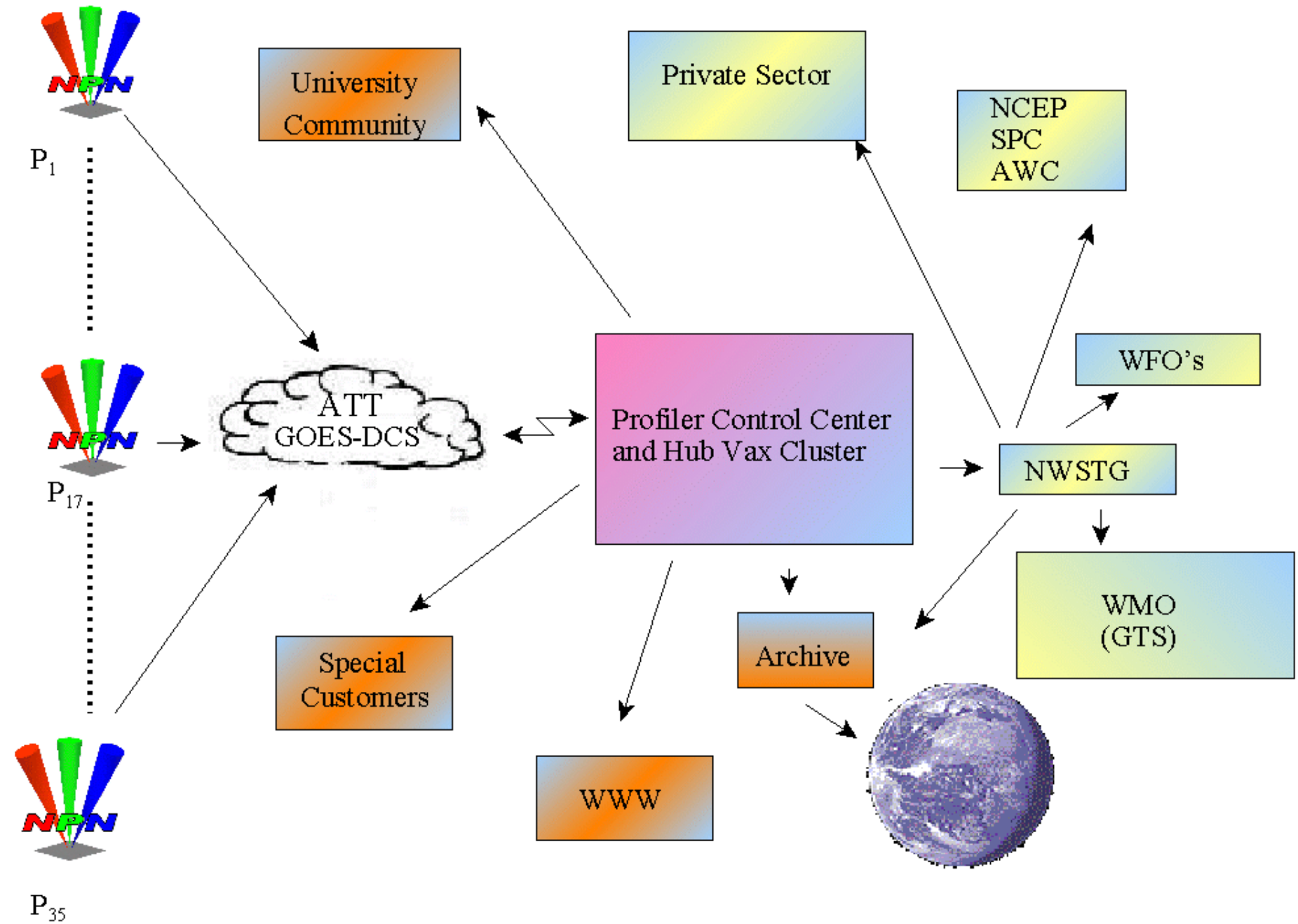
- NPN 6 – Minute Data
  - NWS / Storm Prediction Center (Started about May 2000)
  - NWS / Central Region HQ (Establishing procedures)
  - NWS / Southern Region HQ (Likely – after CR procedures verified)
- NWSTG → NCEP and → AWIPS and → GTS
  - Single station NPN
  - 6 – Minute NPN winds
  - NPN RASS and Surface Met data
  - GPS moisture data and companion Surface Met data
  - CAPs wind and RASS

New Developments in Profiling

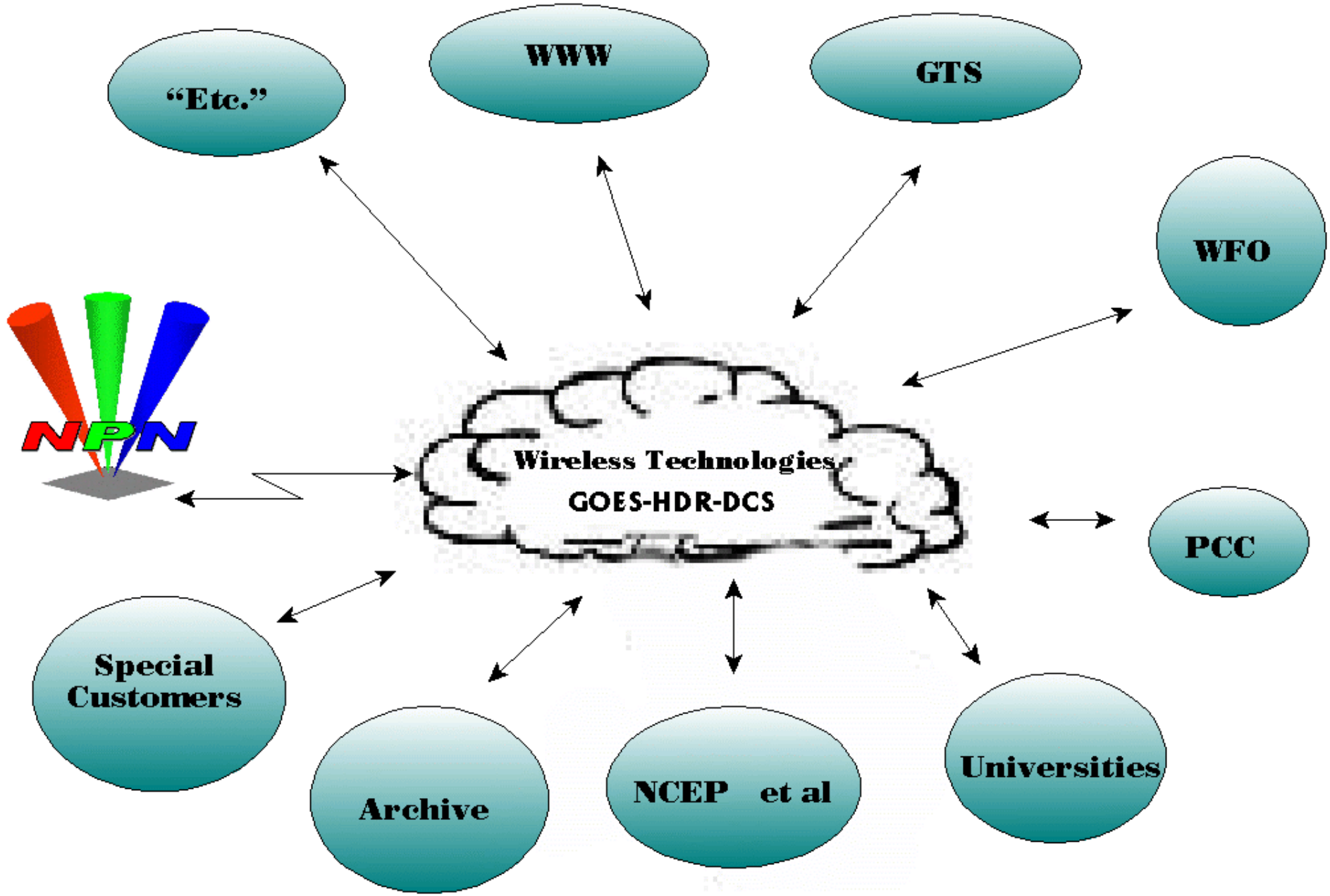
System Capabilities

- Advanced Signal Processing
  - Peak - Picking Algorithms and Wavelet Transforms
  - Clutter removal algorithms
  - Bird identification and removal algorithms
- Number of Antenna Beams: 3 vs 5
- Next Generation RASS (reduces siting restrictions)
- 449 MHz modular architecture (Cost vs Height)
- Network Architecture – Use of new network/communication technologies

NOAA Profiler Network - Current Network Architecture



National Profiler Network – Future Network Architecture



Pending Extinction of the NOAA Profiler Network

Background:

- 30 of the 35 profilers in the NPN operate at an

EXPERIMENTAL/UNPROTECTED

frequency of 404.37 MHz.

- Transmission into the atmosphere of the profiler signal at 404.37 MHz directly interferes with satellite-based equipment (Search and Rescue Processor – SARP) used by NOAA's Search and Rescue (SARSAT) program managed by NESDIS.

- Currently, the SARP is on about 6 satellites.

- SARSAT, and its Russian counterpart, COSPAS, is an international search and rescue program to which 33 nations belong.

Background (con't):

- As of March 2002, about 14,000 lives have been saved.
- To protect SARSAT, the NPN ceases transmission whenever a SARP-equipped satellite comes in view of an 80^{o} cone (50^{o} above the horizon) extending above the profiler.
- With the current number of satellites, only a small amount of data is missed and the hourly winds are essentially unaffected.
- Some years ago, NTIA designated 449 MHz as the "safe"

OPERATIONAL/PROTECTED

frequency for tropospheric profilers. NTIA then issued a moratorium on any new 404.37 MHz licenses and encouraged the NPN to vacate 404.37 and move to 449 MHz.

The Problem:

- The technology used by the U.S. Global Positioning System (GPS) has expanded to many more applications beyond the original one narrowly defined for defense purposes.
- The European Community (EU) has now provided funding to begin their own "GPS" program called "Galileo". This satellite system (GNSS-Global Navigation Satellite System) will be supporting various missions of the EU operating through the European Space Agency-ESA.
- Each of the Galileo satellites will have a SARP as part of its payload. There will be a

Minimum of 60 – 70 satellites

in the combined U.S. and EU constellations.

The Problem (con't):

- Launching of the Galileos will begin in 2004 with a targeted completion date of 2008 – 09.
- In order for the ESA to hold onto its frequencies allocated by the International Telecommunications Union, it **MUST** have a satellite launched by **February 13, 2006.**
- With SARP's on 60 – 70 satellites, the

NPN transmitters will need to be turned off almost constantly

→ NPN "Out of Business"

The Solution:

***** The NPN must change its center frequency to 449 MHz *****

- A change from 404.37 MHz to 449 MHz requires a different antenna, transmitter and receiver. Remaining components work at any frequency.
- Through a special FY-90 NWS congressional supplemental appropriation, 5 prototype 449 MHz profilers were designed, built and are now operating in Alaska as well as Colorado and New York.
- Over the years, numerous unsuccessful attempts have been made to secure funding to "convert" the 30 remaining 404 MHz profilers.

The Solution (con't):

- A team has been formed to develop a FY-05 Budget Initiative for conversion and expansion of the NPN to a national network probably consisting of a mix of boundary layer and tropospheric profilers.
- Recent briefing to NWS Management regarding initiative met with favorable response.

***** To retain this trusted and valuable National resource, *****

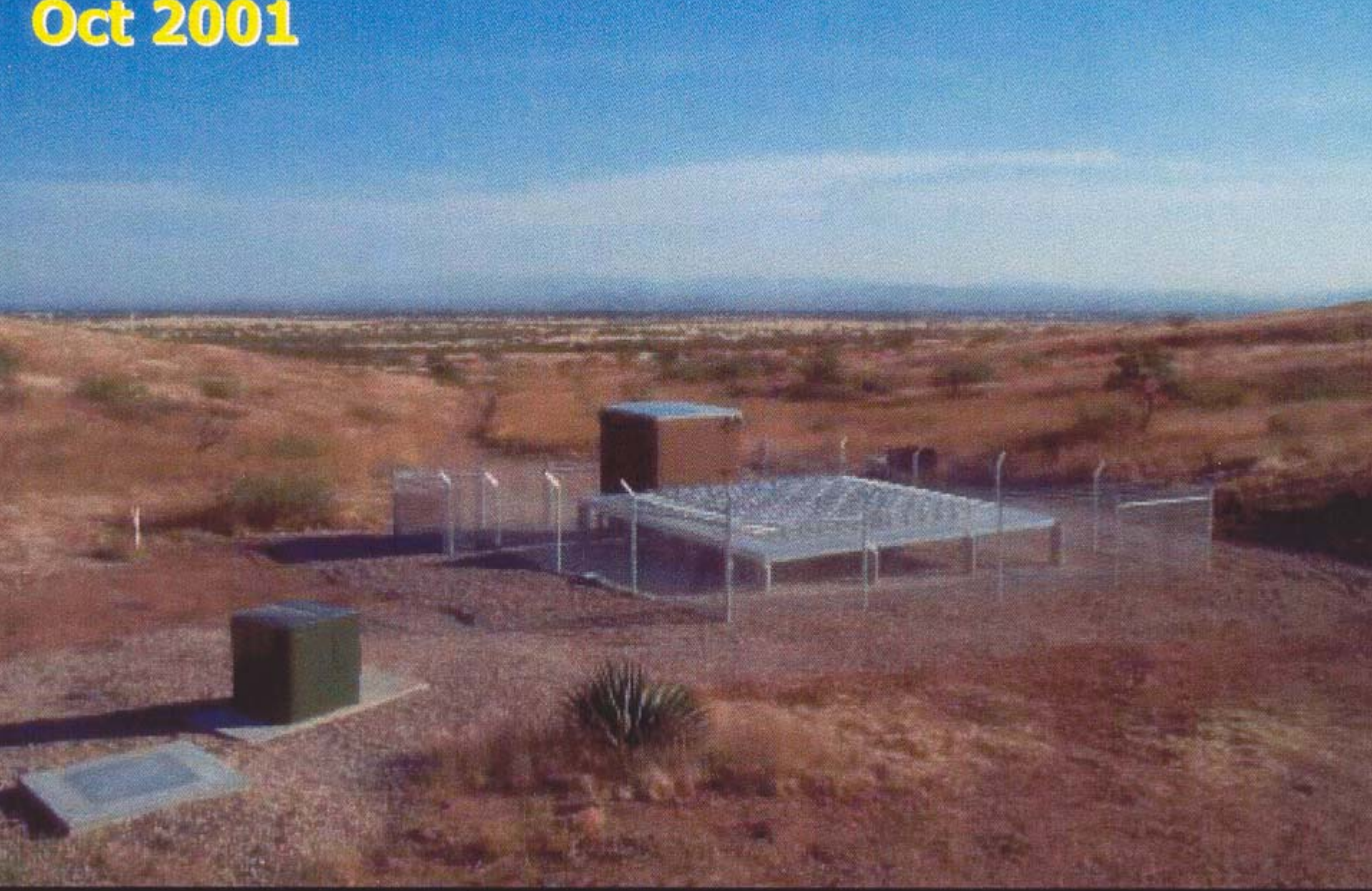
***** NOAA must take immediate action. *****

National Network Plans

Possible Types of Profiler Systems

- **Tropospheric**
  - Frequency: 449 MHz
  - Height Coverage: .5 km to 18.0 km
- **Lower Tropospheric**
  - Frequency: 449 MHz (quarter-scale system)
  - Height Coverage: .1 km to 9.0 km
- **Boundary Layer**
  - Frequency: 915 MHz to 1300 MHz
  - Height Coverage: .1km to 4.0 km (8 km for "super" systems)

With suitable siting, all systems can support temperature profiling (RASS)


Oct 2001

National Network Plans

Possible Locations of Systems

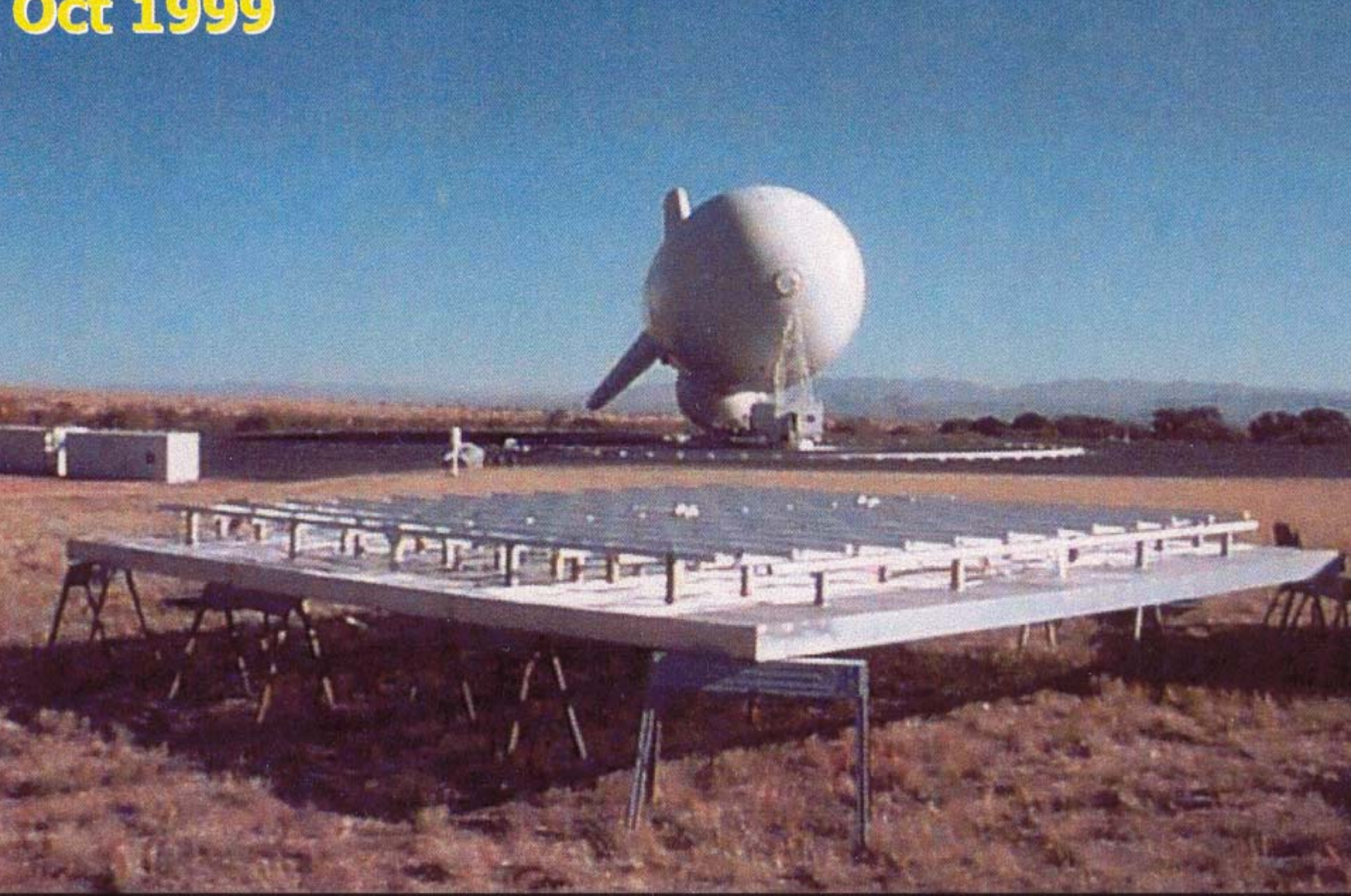
- Number of systems could vary from 30 to about 120
- Possible network configuration could be:
  - 30 Tropospheric Systems
  - 90 Lower Tropospheric/Boundary Layer Systems
- Locations could include:
  - Existing sites
  - NWS WFO'S and/or NEXRAD sites
  - New locations including coastlines

WFOs

National Network Plans

Possible Locations of Systems

- Some systems could be portable
  - Fire weather support
  - Specialized Homeland Security uses


Oct 1999

Battery Box underneath the antenna good for 14 hours operation

SUMMARY

- The NOAA Profiler Network has over 10 years of proven operations.

"NO BLUE SKY"

- The NOAA Profiler Network:
  - Provides critical information.
  - Has a large customer base.
- A National Profiler Network will:
  - Preserve the taxpayer's 15 year investment in the NPN.
  - Provide the Nation with enhanced public safety and property protection.

To Meet the Challenge of 21st Century Weather

Planning and Support for a National Profiler Network

MUST BEGIN NOW

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